

REMARKS

Status of the Claims

Claims 1-14 are currently pending in the application. Claims 1-13 stand rejected. Claims 1, 6 and 8 have been amended as set forth herein. All amendments are made without prejudice or disclaimer. New claim 14 has been added. No new matter has been added by way of the present amendments. Specifically, amendment to claim 1 concerning pH is supported by the specification at page 11, last paragraph, lines 1-2. The remaining changes to claim 1 are merely to improve the form thereof. The amendments regarding mixtures of oxidizers is supported by the specification of page 15, second paragraph. New claim 14 is supported by the as-filed claims, specifically claim 8. Reconsideration is respectfully requested.

Rejections Under 35 U.S.C. § 112, Second Paragraph

Claim 8 stands rejected under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. (*See*, Office Action of December 12, 2005, at page 2, hereinafter referred to as "Office Action"). Applicants traverse the rejection as set forth herein.

The Examiner states that the word "preferably" recited in claim 8 is indefinite. To expedite prosecution, claim 8 has been amended to remove the word "preferably." The phrase following the word "preferably" has been removed to a dependent claim, new claim 14.

Reconsideration and withdrawal of the indefiniteness rejection of claim 8 are respectfully requested.

Rejections Under 35 U.S.C. § 103(a)

Claims 1-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jokinen, U.S. Patent No. 5,888,404 (hereinafter referred to as “Jokinen”) in view of Weissenberg et al., U.S. Patent No. 6,368,511 (hereinafter referred to as “Weissenberg et al.”) and Blais et al., U.S. Patent No. 6,855,256 (hereinafter referred to as “Blais et al.”). (*See, Id.*). Applicants traverse the rejection as hereinafter set forth.

The Examiner states that Jokinen discloses a method of treating sludge substantially as claimed in the present application. (*Id.*). The Examiner further states that Weissenberg et al. disclose the use of Fenton reagent to aid in reducing odor and that dewatering sludge is known in the art. (*Id.*). The Examiner also states that Blais et al. disclose the use of a centrifuge to dewater sludge. (*Id.* at page 3). The Examiner also states that the “specific pH, time period, molar ratio, amount, and solids content utilized, would have been an obvious matter of process optimization to one skilled in the art, depending on the specific sludge treated and results desired.” (*Id.* at pages 2-3).

Jokinen

Jokinen discloses acid treatment of sludge to dissolve metal and phosphorous. In Jokinen, the sludge may be oxidized with hydrogen peroxide to form Fe(III). (*See, Jokinen*, abstract and at column 4, line 52). Jokinen discloses precipitation with phosphorous to yield ferric phosphate for the specific purpose of recovering ferric phosphate from the sludge. (*Id.* at column 4, line 65 to column 5, line 8). This precipitate is then further processed by Jokinen to produce a ferric coagulant and a phosphate product, wherein said “very pure” phosphate may be

used as a raw material for, for instance, production of detergents. (*Id.* at column 5, lines 31 to 42). Thus, in contrast to the present invention, ferric phosphate is not present at the final dewatering stage of the sludge according to the method of Jokinen, *i.e.*, the final filtrate water returned to be recycled does not contain any ferric phosphate. (*Id.* at column 5, lines 13-18 and lines 31-42).

In contrast, ferric phosphate and its presence at the dewatering stage is critical to the present invention because the ferric phosphate, among other factors, provides the ability to achieve superior dewatering results compared to the results previously achieved in the art.

The Examiner states that the only difference between the present claims and the claims of Jokinen is that a Fenton's reaction is used "to form trivalent iron and free radicals to precipitate trivalent iron phosphate, and produce a deodorization and sanitation effect." Thus, even the Examiner admits that Jokinen cannot form the basis of a *prima facie* case of obviousness because Jokinen does not recite each and every element of the presently claimed invention, as is required by law. (*See*, Office Action, at page 2, and *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991), MPEP § 706.02(j)). However, these are not the only differences between the disclosure of Jokinen and the presently claimed invention.

The process disclosed by Jokinen is motivated by the desire to recover metal and phosphorous and to discharge heavy metals. Thus, one of ordinary skill in the art might consider the disclosure of Jokinen to determine how to isolate and purify heavy metals and phosphates from wastewater, but not for the purpose of determining how to efficiently and effectively dewater sludge and deodorize sludge. That is, the present invention is directed to treating sludge containing organic matter, not to recovering metals and phosphorous from wastewater.

Additionally, it appears that in the process of Jokinen, the sludge from the wastewater treatment plant already has been acid-treated one time to separate the organic sludge from the metal sludge. (*Id.* at abstract, “said wastewater is acidified to dissolve metals contained in the sludge,” etc.). However, in contrast, this preliminary step is not required in the presently claimed invention. According to the presently claimed invention, there is no separation of the wastes. Thus, for at least these reasons, the sludge in Jokinen, which is simply a byproduct, removed and discarded, is not even comparable to the sludge according to the present invention, which after processing is deodorized and sanitized.

More particularly, the disclosure of Jokinen separates the sludge at different stages and recovers ferric phosphates from the metal sludge. Thus, one of ordinary skill in the art, in possession of the disclosure of Jokinen, cannot derive the dewatered sludge achieved through the presently claimed invention having the same high solids content. Furthermore, deodorization and sanitation effects according to the present invention could not be achieved considering only the teachings of Jokinen because the process disclosed by Jokinen is different from the process disclosed by the present invention and because Jokinen is motivated to achieve different results, directed at the wastewater, not the sludge, from those achievable in light of the present disclosure.

Thus, the teachings of Jokinen are unrelated to those of the present invention and, in fact, teach away from the present invention because Jokinen is directed to achieving an unrelated goal, that is, isolation and purification of phosphates and heavy metals from wastewater. Furthermore, there is no motivation found within Jokinen to so drastically modify the teachings

of Jokinen to achieve the beneficial results of the presently claimed invention. (*See, In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991)).

Weissenberg et al.

The Examiner cites to the secondary reference of Weissenberg et al. for the proposition that it is known in the art to use the Fenton reaction. (*See, Office Action at page 2*). The disclosure of Weissenberg et al. is directed to improving dewatering of sludge. (*See, Weissenberg et al.*, abstract). Weissenberg et al. acid treat sludge at a pH of less than 5.0. (*Id.* at column 6, lines 17-35). The sludge is also oxidized with hydrogen peroxide and iron, according to Weissenberg et al. (*Id.* at column 6, lines 44-63). After these processes, the sludge is made more alkaline by increasing the pH with earth metals to yield a limed sewage at pH 9-11. (*Id.* at column 7, lines 1-9).

Thus, Weissenberg et al. require a high pH “to from 9 to 11” before dewatering. (*Id.* at column 7, line 2). This is in marked contrast to the presently claimed invention, which requires a high pH “of at most 7.0” before dewatering, as recited in claim 1. Weissenberg et al. discloses a process wherein the use of calcium hydroxide is critical to the invention to increase the pH of the sludge. (*Id.*). Without addition of calcium hydroxide, the dewatering results of the Weissenberg et al. process could not be achieved. In contrast, the present invention does not require the use of calcium hydroxide to achieve the beneficial results of high dewatering. In fact, the presently claimed invention requires the opposite of the teachings of Weissenberg et al. by requiring a low pH, less than 7.0. The Weissenberg et al. invention is directed to a process whereby the pH is increased for the purpose of rebinding heavy metals that have been dissolved in the previous

acidic environment. In contrast to Weissenberg et al., the process of the presently claimed invention does not rebind heavy metals in the sludge. Thus, Weissenberg et al. clearly also teaches away from the presently claimed invention, as recited in claim 1.

Furthermore, the process disclosed by Weissenberg et al. does not disclose a method of controlling phosphorous. Weissenberg et al. do not disclose the formation of a ferric phosphate, or the important ratio between Fe and P, as disclosed in the presently claimed invention. Weissenberg et al. further do not even disclose how these elements, important to the presently claimed invention, effects the sludge. Additionally, the process of the presently claimed invention does not require calcium hydroxide or a high pH to achieve extensive dewatering, deodorizing and sanitation effects.

Thus, the disclosure of Weissenberg et al. do not cure the defects of the disclosure of Jokinen. Furthermore, the disclosure of Weissenberg et al. actually teaches away from the present invention due to the marked differences in methods. Additionally, there is no motivation found within the disclosures or in the knowledge generally available to one of ordinary skill in the art, to modify or combine this reference with that of Jokinen to achieve the superior results of the presently claimed invention. (*See, In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991)).

Blais et al.

The Examiner cites an additional secondary reference of Blais et al. for the general blanket statement that “it is known in the art to utilize acid, hydrogen peroxide, and ferric iron to aid decreasing odor, destroying pathogenic organisms, and dewatering sludge.” (*See, Office*

Action, at page 2). However, even the additional secondary reference of Blais et al. cannot cure the defects still present in the prior two references and the Examiner somewhat overstates the disclosure of Blais et al. The method disclosed by Blais et al. requires acid treatment and oxidization to remove heavy metals and destroy pathogens. (*See*, Blais et al. at abstract). The Blais et al. method is a hybrid method that combines biological activity with chemical reactions. (*Id.*). In contrast, the presently claimed invention is not directed to removing heavy metals, as in Blais et al. Blais et al. further require a coagulation agent. (*Id.* at Figure 1, "coagulation aid"). Furthermore, Blais et al. require the use of ferrous sulphate to achieve the results of the process. (*Id.*). The ferrous sulphate is directed at treating the bacterial flora in the sludge and is converted to ferric sulphate, which then acts as an oxidizing agent. (*Id.* at column 6, lines 54-59, column 7, lines 101-5 and Figure 2). Thus, ferrous material is converted to ferric by the action of the bacteria present in the sludge (or added to the sludge). The ferric material is then utilized as an oxidizing agent. Thus, the ferrous material in Blais et al. does not undergo the same type of transformation achieved in the presently claimed invention due to the presence of these bacteria.

Additionally, the process disclosed by Blais et al. requires a pH above 2 to avoid undesirable dissolution or degradation of fertilizing elements. (*Id.* at column 7, lines 23-28). Also, the process of Blais et al. does not alter the composition of fertilizing agents present in the sludge, in contrast to the process according to the presently claimed invention. Blais et al. also do not disclose the use of ferric phosphate to improve dewatering or the important ratio between Fe and P in the sludge.

Thus, none of the references, individually or in combination, recite all of the elements of the presently claimed invention. Therefore, the cited references, even in combination, cannot

form the basis of a *prima facie* case of obviousness. (*In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991), MPEP § 706.02 (j)).

Dependent claims 2-13 are non-obvious, *inter alia*, as depending from a non-obvious base claim, claim 1.

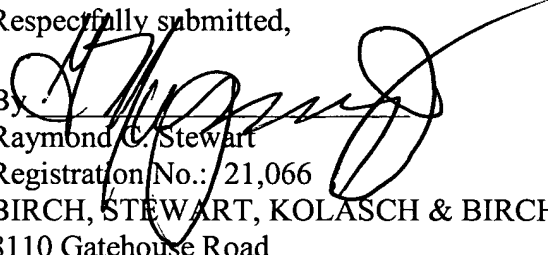
Reconsideration and withdrawal of the obviousness rejection of claims 1-13 are respectfully requested.

If the Examiner has any questions or comments, please contact Thomas J. Siepmann, Ph.D., Registration No 57,374 at the offices of Birch, Stewart, Kolasch & Birch, LLP.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to our Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

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Respectfully submitted,

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